UNITED STATES PATENT AND TRADEMARK OFFICE **CERTIFICATE OF CORRECTION**

PATENT NO.

: 7,642,219 B2

APPLICATION NO.: 10/586171

: January 5, 2010

INVENTOR(S)

: Tsuaki Odaka et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Columns 55 and 56

Delete claims

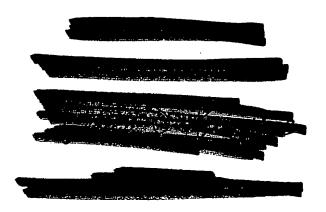
1-16 and substitute therefore the attached

Page I of

& consteh claims 1-13

Delete the title page and substitute therefore the attached title page showing corrected number of claims in patent.

This certificate supersedes conflicate of conection issued March 30,2010.



Or an (Previously Research) as the thermal transfer sheet according to the the content of serial modification by invitation are such that 10% by weight to 50% by weight based on the total solid content of the The thermal transfer elegat according to claim 17 the coverage of the component(s) constituting the across over is 0.01 to 0.3

A thermal transfer sheet comprising: a substrate; a heat resistant slip layer; an adhesive layer; and a dye layer, wherein

said heat resistant slip layer is provided on one side of said substrate, said adhesive layer and said dye layer are provided in that order on the other side of said substrate, and

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said adhesive layer comprises a polyvinylpyrrolidone resin and a saccharide or a sugar alcohol.

The thermal transfer sheet according to claim , wherein the content of said saccharide or sugar alcohol in said adhesive layer is 5% by weight to 10% by weight based on the total solid content of the components constituting the adhesive layer.

The thermal transfer sheet according to claim, wherein the coverage of the component(s) constituting the adhesive layer is 0.05 to 0.3 g/m² on a dry basis of the adhesive layer.

A thermal transfer sheet comprising: a substrate; a heat resistant slip layer; an adhesive layer; and a dye layer, wherein

said heat resistant slip layer is provided on one side of said substrate, said adhesive layer and said dye layer are provided in that order on the other side of said substrate, and

said adhesive layer comprises a polyvinylpyrrolidone resin and a complex forming agent.

The thermal transfer sheet according to claim, wherein the content of said complex forming agent is 0.5% by weight to 10% by weight based on the total solid content of the components constituting the adhesive layer.

The thermal transfer sheet according to claim \bullet , wherein the coverage of the component(s) constituting the adhesive layer is 0.05 to 0.3 g/m² on a dry basis of the adhesive layer.

A thermal transfer sheet comprising: a substrate; a heat resistant slip layer; an adhesive layer; and a dye layer, wherein

said heat resistant slip layer is provided on one side of said substrate,

said adhesive layer and said dye layer are provided in that order on the other side of said substrate, and

said adhesive layer comprises a polyvinylpyrrolidone resin and a modifying agent for modifying said resin, wherein said modifying agent is at least one of carboxylmethylcellulose, cellulose acetate, cellulose acetate propionate, dibutyl tartrate, dimethyl phthalate and shellac resins.

The thermal transfer sheet according to claim wherein the content of said modifying agent is 0.5% by weight to 10% by weight based on the total solid content of the components constituting the adhesive layer.

The thermal transfer sheet according to claim , wherein the coverage of the components constituting the adhesive layer is 0.05 to 0.3 g/m² on a dry basis of the adhesive layer.

A thermal transfer sheet comprising: a substrate; and an adhesive layer and a dye layer provided in that order on at least one side of the substrate, wherein

said adhesive layer comprises a polyvinylpyrrolidone resin,

- (A) at least one component selected from the group consisting of polyurethane resins and acrylic polyol resins that are soluble in a mixed solvent composed of methyl ethyl ketone and isopropyl alcohol at a weight ratio of 1:1 and, even when diluted to a solid content of 5% by weight, do not gel, and
- (B) at least one component selected from the group consisting of isocyanates, blocked isocyanates, and aluminum chelating agents that are soluble in a mixed

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solvent composed of methyl ethyl ketone and isopropyl alcohol at a weight ratio of 1: 1 and, even when diluted to a solid content of 5% by weight, do not gel.

The thermal transfer sheet according to claim , wherein said adhesive layer further comprises a modification product of a polyvinylpyrrolidone resin.

The thermal transfer sheet according to claim , wherein

the content of at least one component selected from said group (A) in said adhesive layer is 1% by weight to 30% by weight based on the total solid content of the components constituting the adhesive layer, and

the content of at least one component selected from said group (B) in said adhesive layer is 1% by weight to 10% by weight based on the total solid content of the components constituting the adhesive layer.

The thermal transfer sheet according to claim wherein the coverage of the components constituting the adhesive layer is 0.01 to 3.0 g/m² on a dry basis of the adhesive layer.



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(54) THERMAL TRANSFER SHEET

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U.S.C. 154(b) by 179 days.

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§ 371 (c)(1),

(2), (4) Date: Jul. 17, 2006

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B41M 5/50

(2006.01)

B41M 5/42 (2006.01)

(52) U.S. Cl. 503/227; 428/32.81

Field of Classification Search None See application file for complete search history.

(56)References Cited

U.S. PATENT DOCUMENTS

3,216,983	Α	11/1965	Shelanski et al.
5,106,217	٨	4/1992	Mecke et al.
5,147,843	Α		Bodem et al.
5,306,691	Α		Bauer et al.
2003/0181331	A1		leshive et al

FOREIGN PATENT DOCUMENTS

JP	02-074375 A1	3/1990
JР	05-131760 A1	5/1993
JР	07-179072 A1	7/1995
.TP	2002-274046 AT	9/2002
JP	2003-312151	11/2003
JP.	2003-312151 A1	11/2003
JP	2004-074766 AT	1/2004

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(57)ABSTRACT

Disclosed is a thermal transfer sheet that can meet demands for increased printing speed in thermal transfer, higher density of thermally transferred images, and higher quality. The thermal transfer sheet comprises a substrate and an adhesive layer and a dyc layer provided in that order on one side of the substrate, wherein the adhesive layer comprises a polyvinylpyrrolidone resin and a composition for suppressing hygroscopic properties of the polyvinylpyrrolidone resin.

13 Claims, 1 Drawing Sheet

